



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/022,349	12/20/2001	Hann-Ping Hwang	HWAN3013/EM	2598

23364 7590 08/08/2003

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314

EXAMINER

WILLE, DOUGLAS A

ART UNIT PAPER NUMBER

2814

DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/022,349

Applicant(s)

HWANG ET AL.

Examiner

Douglas A Wille

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 20 – 28, 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al. in view of Matsuoka et al. and Sugiyama et al.
3. With respect to claim 20, Scott et al. show (see Figure 3 and column 2, line 50 et seq.) a substrate 10, a phototransistor 250, a bipolar transistor 260 with collector layers 30, 40, base layer 60, emitter layer 90, 100 and distinct mesas are formed which are separated by a space which provides insulation and are formed on a single substrate. The Scott et al. device is a high speed device (column 2, line 30), has a multilayer collector 30, 40 and is intended for edge illumination. Matsuoka et al. show a similar device (see cover Figure and column 4, line 48 et seq.) which is intended for top illumination and uses layers 7, 7a as absorption layers with 3, 4, 5 and 6 being part of the collector. It would have been obvious to use the Matsuoka et al. structure in the Scott et al. device for a top illuminated device to provide the structure for a different application. Scott et al. and Matsuoka et al. both show III-V materials but Sugiyama et al. show that a related structure (see Figure 17 and column 13, line 57 et sq.) can be formed with a Si substrate and uses SiGe since SiGe can be used to select the wavelength of sensitivity and uses an inexpensive Si process. It would have been obvious to use the Sugiyama et al. material to achieve the wavelength selection capability and the use of inexpensive processing. Note also that Sugiyama et al. show that recombination at the end faces of a mesa can cause recombination (column 2, line 41) and therefore uses a dielectric isolation 5.

Art Unit: 2814

4. With respect to claim 21, Sugiyama et al. show a Si wafer (column 7, line 23).
5. With respect to claim 22, there is a deep trench 5 filled with an insulator (column 8, line 66).
6. With respect to claim 23 the collector is Si.
7. With respect to claim 24, the absorbing layer of Sugiyama et al. is a Si/SiGe superlattice (column 1, line 37).
8. With respect to claim 25, the base is Si and the thickness is a design parameter subject to routine experimentation.
9. With respect to claim 26, the emitter is Si.
10. With respect to claim 27, it is standard that for bipolar devices the structure is either pnp or npn.
11. With respect to claim 28, the emitter either covers all or part of the base.
12. With respect to claims 37 and 39, insulator 5 extends to the wafer.
13. Claims 29 – 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al. in view of Sugiyama et al.
14. With respect to claim 29, Matsuoka et al. show (see cover Figure and column 4, line 48 et seq.) a bipolar/detector device on a single substrate, which is intended for top illumination and uses layers 7, 7a as absorption layers with 3, 4, 5 and 6 being part of the collector and has and base 8 and emitter 9. Matsuoka et al. show III-V materials but Sugiyama et al. show that a related structure (see Figure 17 and column 13, line 57 et sq.) can be formed with a Si substrate and uses SiGe since SiGe can be used to select the wavelength of sensitivity and uses an inexpensive Si process. It would have been obvious to use the Sugiyama et al. material to

Art Unit: 2814

achieve the wavelength selection capability and the use of inexpensive processing. Note also that Sugiyama et al. show that recombination at the end faces of a mesa can cause recombination (column 2, line 41) and therefore uses a dielectric isolation 5.

15. With respect to claim 30, Sugiyama et al. show a Si wafer (column 7, line 23).
16. With respect to claim 31, there is a deep trench 5 filled with an insulator (column 8, line 66).
17. With respect to claim 32, the collector of Matsuoka et al. includes layers 2 – 7.
18. With respect to claim 33, the absorbing layer of Sugiyama et al. is a Si/SiGe superlattice (column 1, line 37).
19. With respect to claim 34, the base is Si.
20. With respect to claim 35, the emitter is Si.
21. With respect to claim 36, it is standard that for bipolar devices the structure is either pnp or npn.
22. With respect to claim 38, insulator 5 extends to the wafer.

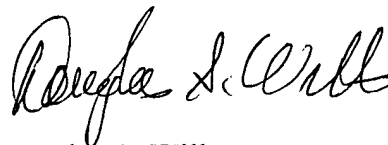
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas A Wille whose telephone number is (703) 308-4949.

The examiner can normally be reached on M-F (6:15-2:45).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Art Unit: 2814

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read "Douglas A. Wille". The signature is fluid and cursive, with the first name "Douglas" being more prominent.

Douglas A. Wille
Patent Examiner

July 29, 2003